Gas Journal

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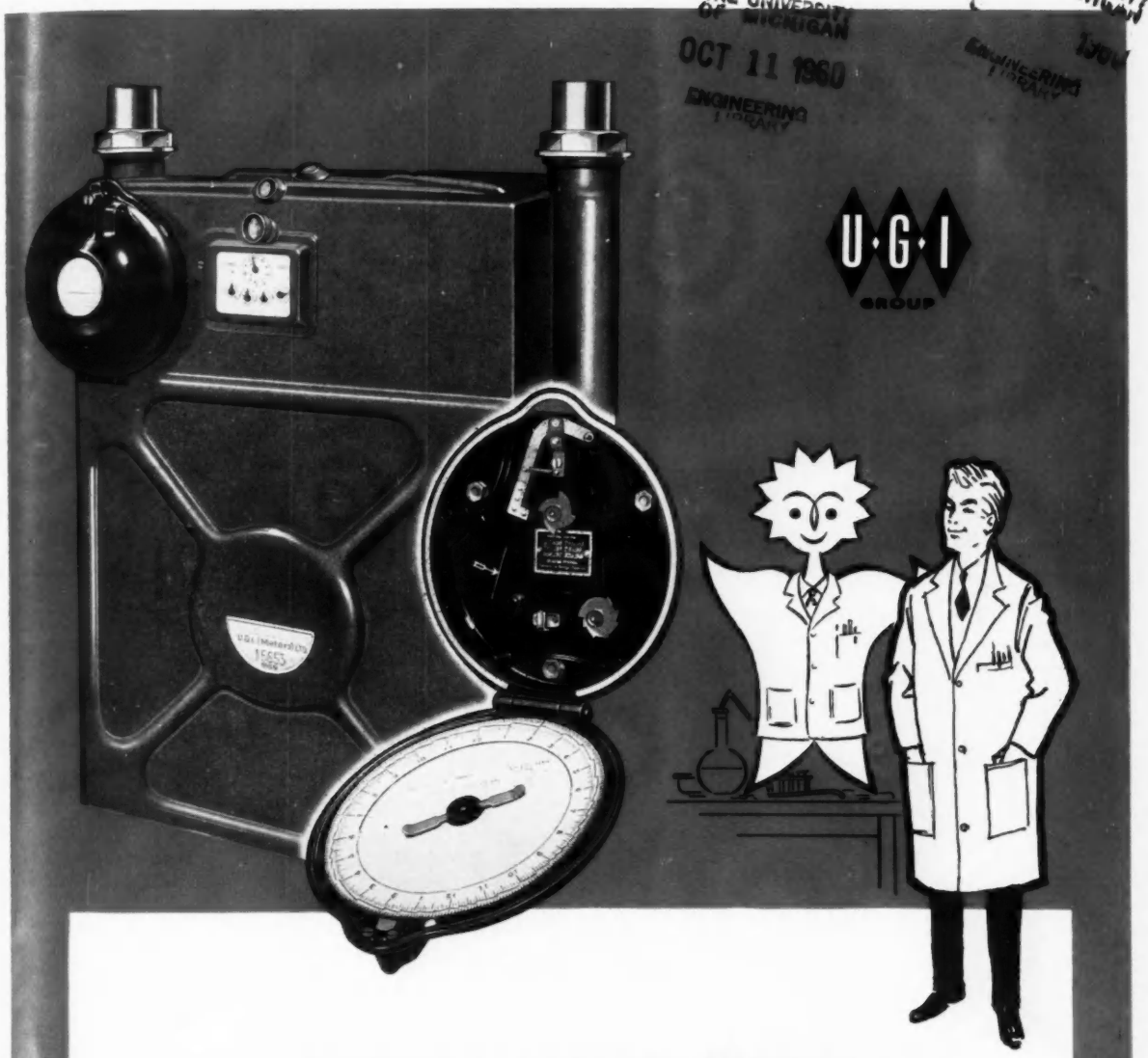

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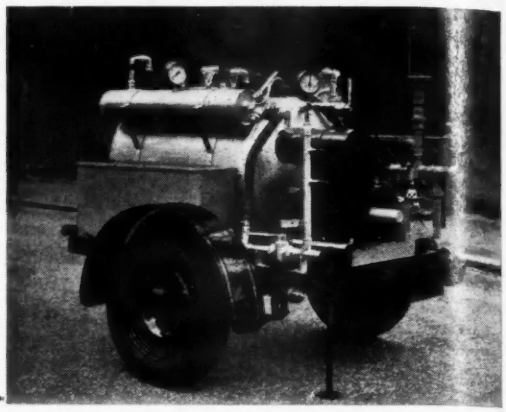
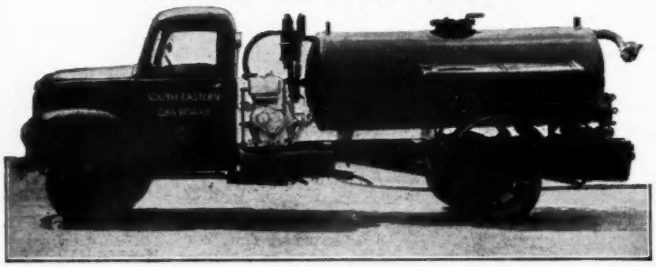


SYPHON EMPTYING OUTFIT



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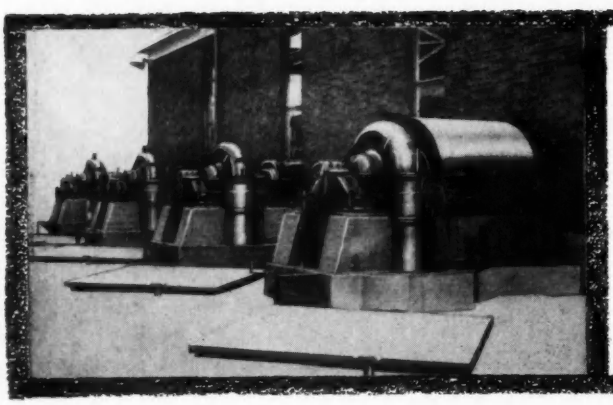

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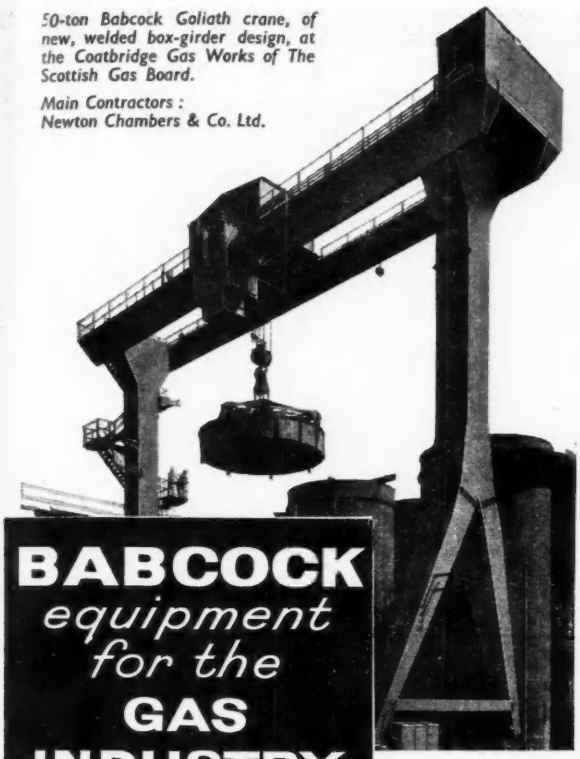

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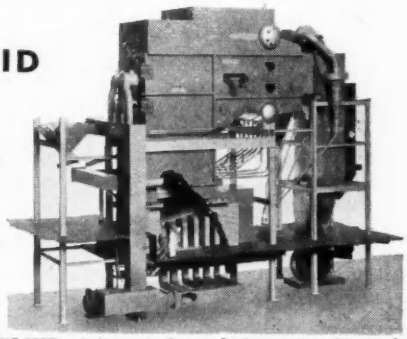

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Gas Journal

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PUBLISHERS' NOTICE, SEE PAGE 413, SEPTEMBER 14

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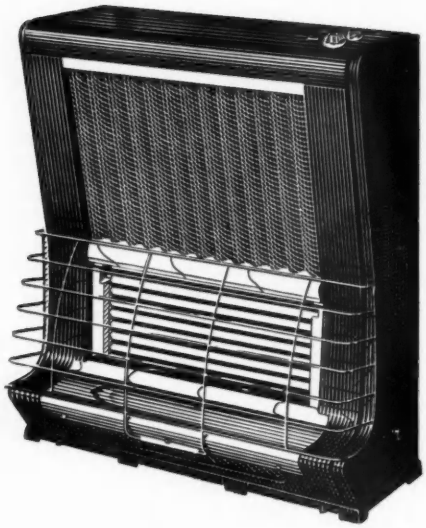

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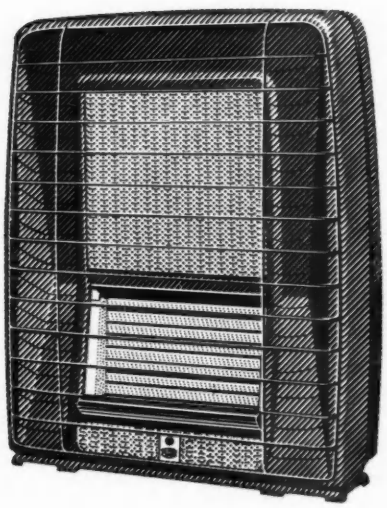

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Gas Journal

COKE OVENS • BY-PRODUCTS • CHEMICALS

What we shall hear at Stockholm

TECHNICAL conferences at international level can be of the utmost value for the dissemination of ideas. Conclusions from them should, however, be drawn with care, and caution should always temper the tendency to adopt uncritically new processes and methods for the use of new materials successfully exploited in a foreign country. Conditions obtaining in that country may be totally different from those under which gas engineers are working in Great Britain; before full use can be made of any such process, it may well need costly redevelopment.

Such were our thoughts when we glanced at the provisional programme for the meeting of the International Gas Union in Stockholm in June next year, under the presidency of Herr B. M. Nilsson.

The fair city of Stockholm, towards the end of June, when the days are at their longest, should be a wonderful setting for an international meeting and anyone who is visiting the Swedish capital for the first time will be able to judge for himself whether the name, Venice of the North, is a fair description. Seasoned travellers may well agree that such a description falls far short of the truth.

We may well ask ourselves whether the full use can, indeed, be made of all the information contained in the 43 individual papers, the five international reports or the four reports of the standing committees. We in Great Britain may sometimes seem slow to adopt many of the excellent ideas being put forward by individuals from foreign countries in such a spate of papers. But, as we have just pointed out, great caution must be exercised. In Great Britain especially, whatever our views may be on the durability of consumer goods, we have a very strict, traditional conception of engineering standards, standards of safety and standards of purity of the product. It is well known for instance that the very harsh British regulations for the inorganic sulphur content of town gas does not make it possible for some Continental purifying processes to be applied in this country without secondary oxide purifiers to act as catch boxes. The very high density of population in the urban parts of this country and the ever contracting stretches of open country demand the highest standards of mainlaying and servicing, and only after the most stringent testing will anything but the best quality metallic tubing be allowed in Britain for house-carcassing. There are difficulties therefore in taking full advantage of the latest long distance gas transport techniques from the United States or the use of plastic tubing from Europe.

This does not detract in any way from the value of the international meeting of the gas or any other industry provided these differences are recognised. In fact any such international meeting should be welcomed as a means of a thorough exchange of ideas. It allows even greater opportunities than is possible by the formal attendance of British and foreign delegates at each-other's national conferences, where they are essentially guests to be entertained by the host country.

They are unlikely to contribute papers unless they are specially invited to do so. At an international conference, delegates from member countries will expect to take part as a right of membership.

In this way engineers and technologists from member countries may begin to realise how in fact their own contributions to the advances in the technology of our industry can affect work that is going on elsewhere and how modifications suggested from abroad might greatly benefit their own work.

If we examine the papers to be presented, they fall into the three categories already referred to, namely reports from standing committees, international reports and individual papers. The first of these will have a truly international flavour since the composition of the committees will consist of members from all countries concerned, so that all conclusions reached will have been thoroughly hammered out before the report is issued.

Reports in the second category generally take the form of answers to a questionnaire circulated to each member country by the particular country charged with the duty of organising the enquiry. At the 1961 meeting the reports will deal with cathodic protection organised by Germany, the treatment of certain gases in relation to their use, by France, while our own Institution is sponsoring an enquiry into unconventional flues, and the use of petroleum products for gasmaking. We feel that the choice of organisers for these enquiries

may well have some bearing on the countries' particular interests in certain aspects of the gas industry at the present time. The gathering of statistics for the gas industry continues to be in the hands of Belgium. This is clearly logical since the headquarters of the I.G.U. is at Brussels.

In the individual papers from member countries, we again detect the particular advances which have been exercising gas engineers in those countries over the last few years.

From Australia will come papers on the carbonisation of low quality coals, on the analysis of gas distribution systems, on the Lurgi gasification plant at Morwell, and finally on c.w.g. operation. Papers from Czechoslovakia are concerned with the economic advantages from the use of gas, coke oven gas for town supply and the economics of high pressure gas.

The Swiss Gas Association contributes a paper on the removal of carbon monoxide from town gas, the United States papers on the storage of liquefied gas caverns, and gas-fired thermocatalytic reactors. The Soviet Union will discuss the development of gas transmission, and transmission and superstructure techniques, among other subjects of interest. France, which is developing its natural gas resources, will contribute papers on the desulphurisation and decarbonation of natural gas, the calculation of long distance transmission systems and—a most important subject under the circumstances—the techniques of gas sales promotion.

Great Britain's contribution will include heat services by gas in houses and flats, developments in industrial gas utilisation, and a review of the techniques concerned with the transport use of liquid methane. In all, 14 countries will be contributing papers.

The future of the Scottish Association

SO the Scottish Association of Gas Managers will apply to become a Section of the Institution of Gas Engineers. If, as seems reasonably certain, the matter will go through, the Association will function as a District Section, although particular care may be necessary in the use of that label. When the President of the Association, Mr. W. S. Johnston, used the word 'District' at the Annual General Meeting at Largs last Thursday, Mr. David Fulton was on his feet in a moment to assert that 'Scotland is more than a district, it is still a nation!' In other words, although the Association is giving up its stand against conformity it is doing so with the flags flying and its traditional pride undiminished.

In the circumstances members have little choice in the matter for the meeting has become almost an extension of the Scottish Gas Board's Staff Conference, complete with pep talk by the Chairman and such papers as the one given last week by Mr. Robert Dunnett on 'Press and Public Relations,' which was very much the sort of thing one might expect at a staff conference. The regrettable thing is that the Association did not wind up its affairs and form a Section of the I.G.E. some years ago, but that would certainly have deprived members of the pleasure of celebrating the Association's centenary next year.

In the light of these matters Mr. Johnston's decision to delve for material for his Presidential Address into the history of 'the Associations from which this present Association sprung and to show how circumstances have brought about changes in their structure and function throughout the years' was timely. The story is an interesting one, starting with the creation of the Waverley Association of Gas Managers in 1861, the first association of its kind in Britain, and the formation the following year of the Scottish Association of Gas Managers and the long-winded Fife, Kinross, Perth and Forfar Association of Gas Managers, both of which were to combine in 1866 to become the North British Association of Gas Managers. Ten years later came the West of Scotland Association of Gas Managers which was amalgamated with the North British in 1883. The latter Association and the Waverley continued their separate existence until 1957 when they became one association, the Scottish Association of Gas Managers.

All rather complicated, but Mr. Johnston unravelled the tangled skein in a remarkably deft manner and with some pleasant touches of humour. The last chapter in his story brings us up to date: 'Since the advent of the nationalisation of the gas industry and, more particularly since the reorganisation which has been carried out by the Scottish Gas Board, leading step by step to the more complete functionalisation of the industry in Scotland, it has been borne upon us that the time has come for further changes in our organisation. The gas managers who formed and carried on the associations no longer exist as such.

'It is now necessary to have an association which will bring together all technically trained gas engineers for discussion, on a common platform, of the problems of the day. By so doing, "the one half will learn how the other half lives," as it seems to me that, in spite of the greatest goodwill on the part of each one of us, there is a tendency to lose sight of what the other fellow is doing and, more important, why he is doing it.'

All this lent particular significance to the fact that the guests from England—Sir Henry Jones, Mr. T. C. Battersby, etc.—included that benign shepherd of the I.G.E., Mr. W. T. K. Braunholtz, come it seemed to safely gather in the last of his reluctant flock.

Mr. Dunnett's paper, to which we have already referred, was one of the best we have come across dealing with the complex subject of public and press relations, a subject which is all too often apt to bring out the author in a rash of high sounding verbiage. On this occasion, however, the paper appeared to us to be a remarkably balanced and thoughtful explanation, although it is a pity that its basic message did not shine through the fireworks of Mr. Dunnett's histrionic presentation.

The other paper was an exhaustive examination of 'Present Day Methods of Heating Domestic Premises' by Mr. Stanley Perriss, Installations Officer of the Scottish Gas Board.

CHEMICALS AND BY-PRODUCTS

The manufacture of by-product sulphate of ammonia

By D. BRADLEY,

Newton, Chambers & Co. Ltd.

SULPHATE of ammonia is the largest single source of nitrogen fertiliser used in the world today, though its utilisation for direct application is on the decline, a greater quantity being used in the compounded form. Although sulphate of ammonia is subsidised to approximately 50% of its market value, the British farmer still lags behind his Continental counterpart in the use of fertilisers. However, the trend is for the home consumption to increase and our export trade has, in fact, declined. This points to a steady market for sulphate of ammonia for the future, as a suitable, slow nitrogen release fertiliser.

Sulphate of ammonia is manufactured by bubbling gas or steam containing ammonia through a bath of sulphuric acid of suitable strength in a saturator. This vessel acts as a scrubber, crystalliser and evaporator.

Three methods of production are generally known, viz., the 'direct,' 'semi-direct' and 'indirect' processes. In the 'direct' process, the whole of the gas and the condensed ammoniacal liquor pass to the saturator. This system has now fallen from favour and the 'semi-direct' and 'indirect' systems are now practised almost entirely.

Another method for sulphate of ammonia production scrubs ammonia from the gas stream by washing the gas in counter current flow with an acid solution of sulphate of ammonia. The liquor leaving the scrubber is then evaporated using steam in a vacuum vessel to cause crystallisation of the salt from the liquor. This method is generally referred to as the 'evaporative' process. One can say of this process that it naturally appeals more to the chemical engineer because of its unit operations, absorption, evaporation and crystallisation, being performed in separate items of plant. It would appear a little more expensive to operate and install, particularly if large crystals are required. This process is fairly widely practised in the U.S.A.

The 'semi-direct' process. Reference to the flow diagram in Fig. 1 will show the general arrangement of such a plant. By-product gas from which tar and liquor has been removed is reheated to a temperature of 60°C. by steam in the heater. The gas stream is joined by the vapours from the two stills, the first being used to strip the free ammonia from the liquor and the second to strip the fixed ammonia by lime addition. The combined stream passes into a bath of dilute sulphuric acid at a concentration of less than 5% w/w. The gas passes through the acid, where it is stripped of its ammonia, along to the final cooler, via an acid catcher, designed to arrest acid spray. The temperature of the bath must be such that there is no build up of water from the steam in the still vapours, and, of greater importance, the mother liquor produced during de-saturation. In this connection the saturator is seen to function as an evaporator.

In modern practice, some means of circulating the acid mother liquor is carried out. In the diagram, this is shown by an overflow arrangement to a balance tank, from which a pump delivers it back to the saturator by way of the make-up acid feed arrangement. This circulation assists in the formation of uniformly sized crystals, assistance also being given by an agitator ring built into the base of the saturator. This point will be discussed more fully under

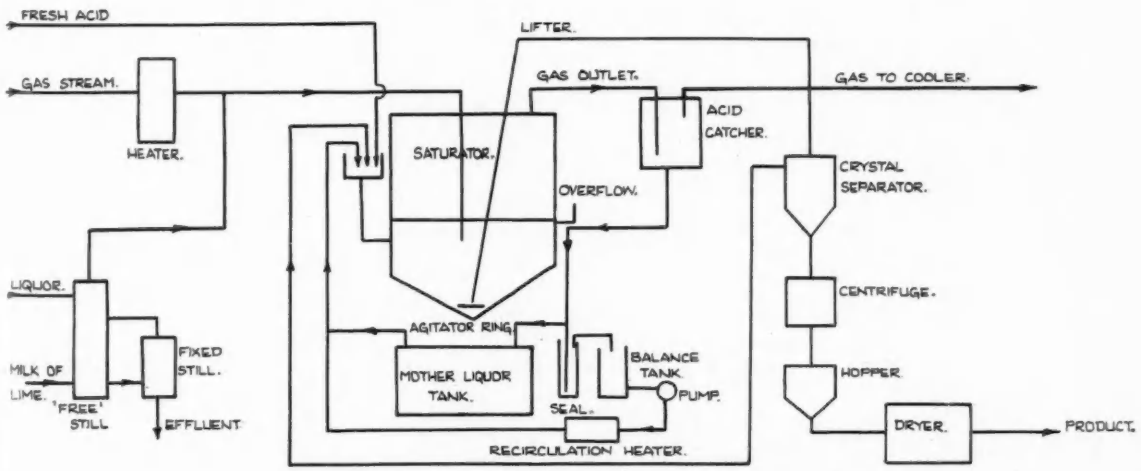

FIG. 1.

FIG. 2.

the description of the equipment. The saturator is now functioning as a crystalliser.

Though agitated, the crystals tend to concentrate in the conical bottom of the saturator. These are extracted by a vertical lifter which can either be operated by steam or air. The crystals accompanied by mother liquor are discharged into a separator, the mother liquor being decanted back to the make-up acid entry point.

The crystals so formed are then discharged to the centrifuge where excess mother liquor is removed by centrifugal action. A wash of water is then given to the crystals to displace the acid adhering to the faces, and further spinning is carried out to remove the excess water. The crystals are then discharged from the centrifuge basket before passing to the crystal dryer.

The crystals are normally dried by heating with steam or hot air. Final neutralisation with gaseous ammonia, the bicarbonate or carbonate of ammonia, can be given at this stage, but with modern techniques of production the water wash is usually sufficient to reduce the acid content of the product to limits falling within the specification.

After a period of operation the saturator needs to be 'desaturated,' since the crystal size begins to deteriorate because of a build up of crystal nuclei. This necessitates the flooding of the saturator with water and acid. This operation causes the crystals to be dissolved along with the incrustation of sulphate which has begun to line the walls. The effect of the incrustation, referred to as 'rock salt,' and the increased amount of 'fines' is to build up the differential pressure across the saturator. This, of course, increases the steam consumption of the exhauster which provides the force to overcome the back pressure. The excess liquor delivered to the saturator overflows to the mother liquor storage, and is intermittently recycled to the saturator with the make-up acid. The quantity of water associated with this recycle has to be evaporated within the period before the next desaturation. To assist in this, a steam heater is installed in the line recirculating the mother liquor.

The 'indirect' process. There is little difference in the mode of operation of this process from that of the 'semi-direct' process. The ammonia remaining in the gas after the primary and secondary coolers is absorbed by water. The ammonia is then stripped from the combined condensate and washer liquor by steam distillation in the presence of lime.

In this process the ammonia is passed into the vessel in a more concentrated form and a smaller saturator is required. An increase in the reaction temperature is caused and as the feed is the vaporised product from the stills, the temperature is higher than that of the entry gas in the 'semi-direct' process. Both these factors lead to a higher bath temperature and gas and mother liquor reheaters are not required. More flexibility is offered by the 'indirect' process since the operation is independent of the main gas stream. A comparison of size can be obtained from Fig. 2 and 3. The 'semi-direct' plant shown produces 14 tons per day and the 'indirect' plant 30 tons per day.

'Semi-direct' saturator

Production plant. Fig. 4 shows a typical 'semi-direct' saturator. The gas, containing approximately 1% of ammonia by volume, passes down the centre pipe which is sealed below the acid level. The gas leaves the saturator through the large outlet pipe at the top right. The acid solution passes out of the overflow on the right of the drawing to a seal pot and is picked up by a pump and recirculated to the 'return well', shown on the left. Commercial B.O.V. (80% w/w sulphuric acid) is also fed into the 'return well', the quantity fed being regulated to maintain the bath strength at the desired level of less than 5%. The agitator ring previously referred to, is shown as a gas coil and below this is an air coil. These are perforated and by passing the appropriate medium, turbulence is caused.

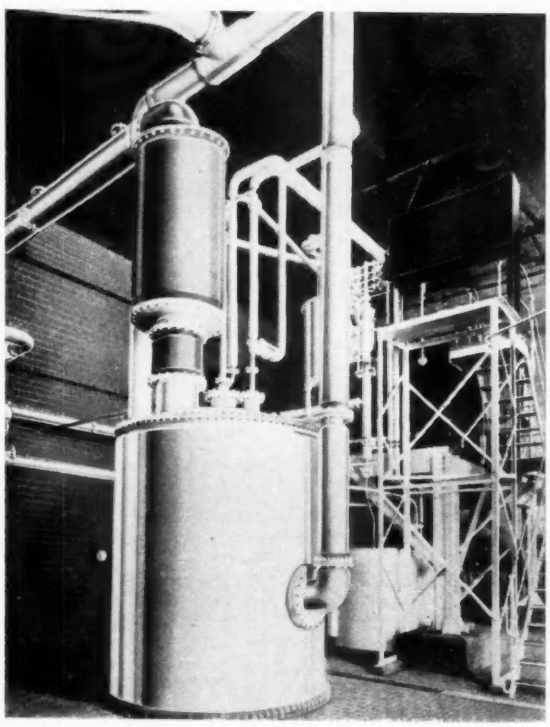

FIG. 3.

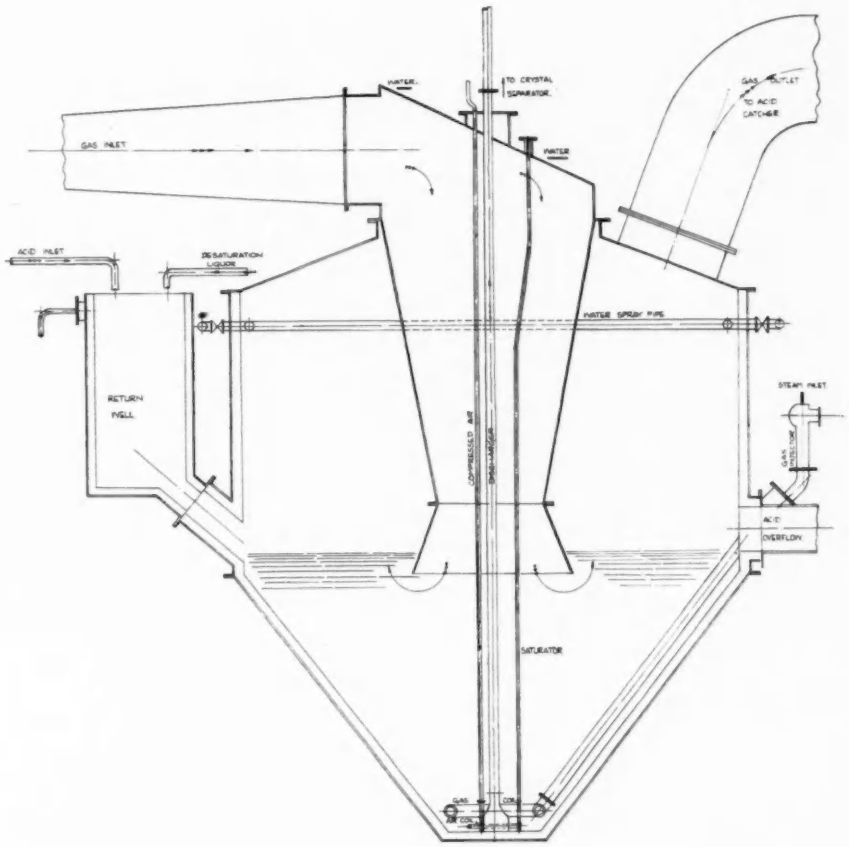

FIG. 4.

Crystal extraction is effected by means of the discharger shown in the centre of the vessel. The compressed air supply by its side is directed up the discharger to lift the product to the crystal separator.

The vessel is fabricated in mild steel with a lead lining on which is placed an acid resisting brick lining. The older saturators did not have a brick lining and relied upon the protective layer of lead sulphate which was formed on the lead lining, to afford the protection. Unfortunately the erosion effect of circulating acid containing crystals, removes the protective sulphate coating. Hence the need for the acid resisting bricks. The acid catcher is also lined in the same manner.

Continuous centrifuges

The centrifuges used in the past have been of the vertical axis type, the operation being batchwise, the dried cake being discharged manually through the bottom of the centrifuge basket to a conveyor or feed table for the dryer. However, the latest plants are using continuous centrifuges, the crystal magna being fed to the drum of the machine continuously.

Water washing is carried out during the travel and the crystals discharged are comparable with those from the more conventional cyclic operation. The size of the centrifuge is greatly reduced by continuous operation as is the power consumption. The advent of the continuous centrifuge makes sulphate of ammonia manufacture a truly continuous operation.

The feed to the centrifuge contains about .5% acid by weight, which is reduced by processing and water washing to less than .025% of acid which is the maximum allowable quantity.

The dryer shown in Fig 5 is the Royston 'flash' dryer which is of the hot air type. The salt is fed from the hopper to the bottom of the lift pipe. A stream of air from the primary air fan, preheated by steam or hot water, is blown up the lift pipe carrying with it the sulphate crystals. The air is discharged to atmosphere, the crystals, being deflected, fall down the major section of the dryer. Here they pass in counter current to the secondary air stream, which is also preheated, forced by the secondary air fan, up the dryer. Louvres in this chamber cause the flows to be broken and ensure efficient drying. The crystals then fall out of circuit into the hopper feeding the automatic bagger.

The air speed in the first lift is 270 ft. per second and the pressure drop through the dryer is from 30 in. to 1 in. w.g. The primary and secondary air are raised to a temperature above 120°F. Technical data on a typical dryer are:

Inlet water content of the crystals, 3.259%
Outlet water content of the crystals, .067%.
Contact time, 3 seconds
Throughput per hour, 2 tons.
Power consumption per ton, 1.29 kWh.
Steam consumption per ton, 116 lb.

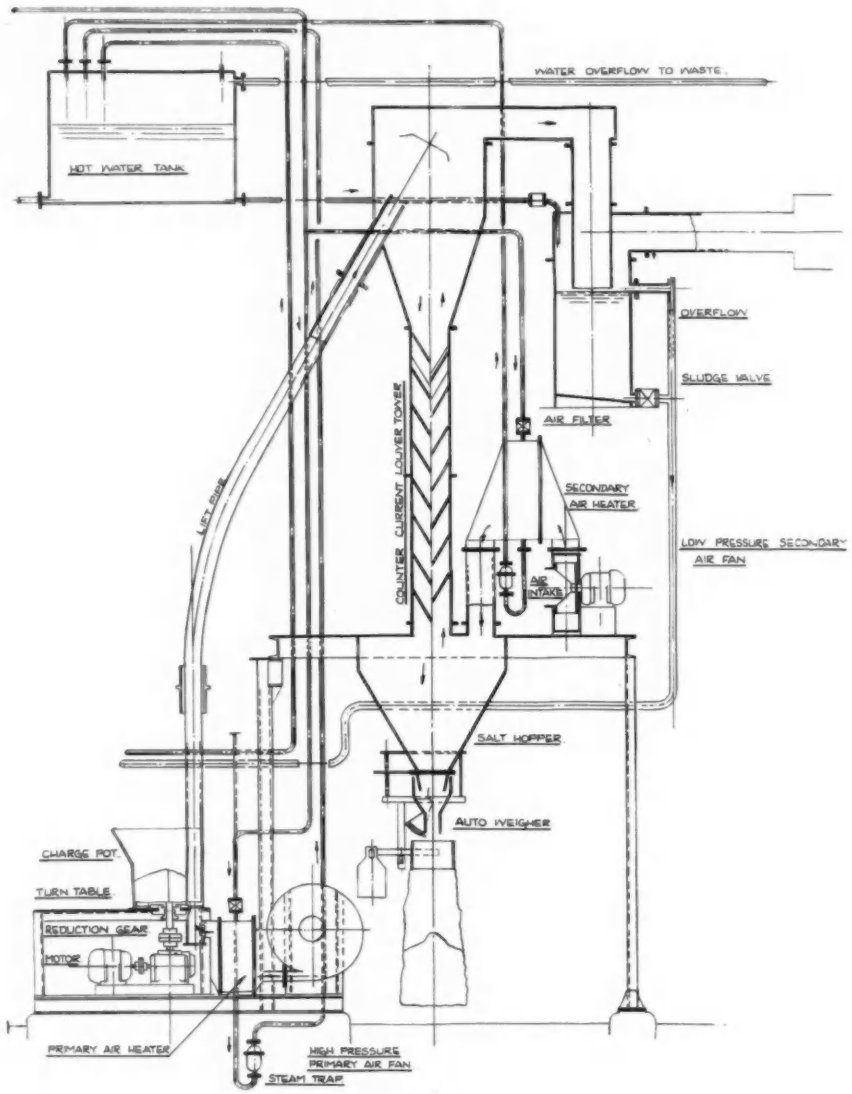

FIG. 5.

The dryer is capable of dealing with course, rice type crystals. The short contact time assures that the crystals suffer no ill effects from heating.

Improved techniques in manufacture. In addition to the continuous centrifuging of the crystals, the agitated saturator has been one of the major advances in manufacture. Although this is not a recent development, it has contributed to the improved quality of the product more than any of the other advance. Sulphate of ammonia is required as a crystalline chemical which is easily handled. The Grade 1 Specification covers this by setting down the physical size analysis as:

No lumps greater than 4 mm. not more than 25% greater than 2 mm.; not more than 40% to pass through 30 mesh B.S.S., and not more than 5% to pass through 72 mesh B.S.S.

The chemical specification is:

Nitrogen 21.00% minimum w/w; sulphuric acid .025% maximum w/w, and water .25% maximum w/w.

The method of production which has been described, was developed to enable this size specification to be attained. The pumped circulation and gas or air agitation are means of maintaining a uniform crystal size. A well designed saturator providing a satisfactory residence time in the mother liquor enables crystals, which satisfy the Grade I Specification, to be produced consistently.

Other factors influence the size of the crystal, however, not the least being the method of desaturation. In some of the older plants desaturation was practised to reduce the differential pressure across the saturator, as frequently as once per shift. This was accomplished, not by the method described, but by 'killing' the bath by the addition of an excess of acid, which brought the strength of the bath up to 10 to 15%. This dissolved some of the 'rock salt' and the whole of the crystals in the bath at that time. A period of up to two hours without any sulphate being lifted was then experienced.

This allowed a maximum of 18 hours a day for the total output to be obtained, considerably reducing the

residence time in what was, probably, a none too large bath. The strength of the acid has a considerable effect on the crystal size, and the first crystals to salt out from a bath which had been as high as 10 to 15% were extremely small. No time was available to allow for growth, and therefore until a reasonable acid concentration was attained, a powdery crystal resulted.

Not alkaline

While the concentration of acid must be kept low, it is also important that the bath should not be allowed to become alkaline. Prussian blue is formed under these conditions giving rise to 'blue salt.' At the expense of insuring against this phenomena, many misguided operators have tended to work with a bath which was too acid, resulting in fine crystals. This leads to a development which the British Sulphate of Ammonia Federation have been pursuing and which is of tremendous importance, *viz.*, *p*H control of the bath with automatic acid addition.

The troubles brought about by fine crystals are many. Primarily the sulphate does not comply with the Grade I Specification which commands a premium price. Removal of acid from a fine crystal is much more difficult as is the subsequent removal of the wash water. It is highly probable that the acid will not be reduced to the required level by water washing alone, and the complication of neutralisation is added. More energy is also necessary for the final drying.

Iron—worst offender

With the most modern equipment, it is still possible to encounter difficulties in maintaining a steady production of sulphate of the required size. The acid used is often a source of concern. The crystal aspect, its length to breadth ratio, is affected by trace impurities in the bath. Notable among these are ferric iron, trivalent aluminium and chromium. In most commercial acid, iron is the worst offender. In the presence of these metallic ions the length: breadth ratio of the crystal increases giving a product which is susceptible to breakage and thus a high dust content. Quality control of the acid to the plant is the best preventive, but a cure may be effected by the addition of a reducing agent to the bath. Ammonium oxalate is most favoured for this purpose.

Another difficulty facing the sulphate manufacturer, particularly with the 'semi-direct' process, is the removal of tar. Efficient electrostatic tar removal goes a long way to solving this problem but not entirely. Some plants augment the natural tar by the use of recovered acid from the benzole refinery. The re-use of acid is in itself a sound economic move, but it would be more economical if the acid were washed to clarify it before passing it to the sulphate plant. However, the removal of the tar as a layer rather than allowing it to become an integral part of the sulphate has been assisted by the addition of creosote oil or a detergent to the bath. This allows the layer to be skimmed off the top of the seal pot in the recirculation circuit.

CHEMICALS AND BY-PRODUCTS

Major variables

It has been stated that the manufacture of sulphate of ammonia from by-product ammonia is not a very rewarding operation. It is necessary to qualify this statement, however, since the assessment is greatly affected by one or two major variables. The merits of costing systems will not be discussed fully, but it may suffice to say that the gas has been stripped of an impurity and some of this cost could be borne by the end gas. In the past, the size of sulphate of ammonia plants has been small, and as such, they have had to carry a large labour cost. The tendency towards larger coke oven plants must certainly have a large bearing on the labour cost per ton, especially if central sulphate plants are to be considered as practical. The second important variable is the cost of the acid. Again the larger plants are in a position to manufacture sulphuric acid from spent oxide. This integration must also lead to a more lucrative proposition.

Finally with modern equipment and adequate control, a product of high quality with reduced repairs and renewals charges is guaranteed, making the manufacture of sulphate of ammonia from a by-product stream worthwhile.

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Effluent treatment at Cwm coke ovens

By D. E. CUNNINGWORTH,
B.Sc., M.I.Chem.E.
Carbonising Scientist, The National Coal Board.

PRIOR to 1950, the National Coal Board possessed five carbonisation plants in South Wales. Of these, the Phurnacite plant at Aberaman and the coke oven installation at Coedely were scheduled to continue in operation and to be increased in size. The remaining coke ovens were to be shut down and replaced by two new plants, each of about 1,500 tons per day capacity. None of the plants, either existing or projected, had any form of effluent treatment.

With the imminent approach of the Rivers (Prevention of Pollution) Act, 1951, it was evident that some solution would have to be found to the effluent problem. In the case of the first new plant, at Nantgarw, a large sewer passed near the works and the sewage authority concerned agreed to accept the effluent. In the case of the second plant—then, of course, only in the planning stage—this solution was not feasible since it would be situated in a sparsely populated district. Furthermore, the only stream in the neighbourhood had a very small flow and could not accept undesirable effluents. Treatment would, therefore, be necessary.

Tar-acid content

Consideration of the likely composition of the effluent from the plant suggested that if the tar-acid content could be adequately reduced, the other constituents would probably be regarded as acceptable. Attention was therefore concentrated on finding a cheap method of phenol removal. A very thorough survey of the problem was made and a good deal of experimental work carried out. Practically all the processes mentioned in the available literature were considered but the general conclusion reached was that most of them were either of no immediate value or would be too costly in practice.

Most National Coal Board carbonisation plants are situated near to froth flotation plants in which tar-acids are commonly used as frothing agents for cleaning fine coal. The possibility was therefore envisaged of replacing these tar-acids by the phenols in coke-oven effluents by employing the latter as make-up water. However, although the idea proved practicable from the froth flotation point of view the effluent, though much improved, still contained about 150 ppm. of phenol. This was not acceptable and attention was then directed to the removal of phenols by biological means.

An intensive investigation in the laboratory showed that this was feasible. A pilot biological oxidation unit was therefore erected at Maritime coke works in the early part of 1954 and put into commission during the summer of that year. This installation was built for the specific purpose of obtaining data to enable an effluent treatment unit to be designed which would serve the projected new 1,500-ton per day coking plant which was to replace the Maritime works.

As a result of this work, which has been described in the literature[1], planning permission was given. The next step however, was to build a plant at Coedely coke ovens which would not only serve the needs of that plant but also provide more accurate design data for the larger unit ultimately to be built at Cwm. The Coedely plant, which has also been described in the literature[2], is shown in diagrammatic form in Fig. 1. It has now worked very satisfactorily for nearly four years and the design of the in-

CONT. on p. 441.

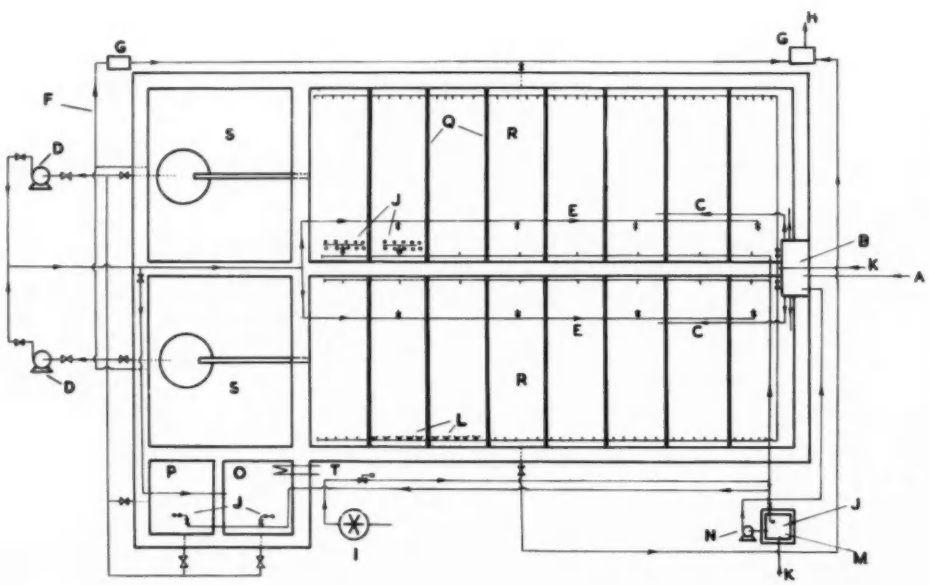

FIG. 1—*A, Feed to plant. B, Splitter tank. C, Feed to tanks. D, Sludge pumps. E, Sludge return. F, Effluent. G, Drains. H, Discharge to settling ponds. I, Air blower. J, Air diffusers. K, Fresh water. L, Sprays. M, Nutrient tank. N, Nutrient pump. O, Conditioning tank. P, Sludge tank. Q, Concrete baffles. R, Reaction tanks. S, Settling tanks. T, Steam coil.*

CONT. from p. 438.

stallation at Cwm follows it very closely, the only material difference being that the latter is of twice the capacity.

The Cwm coke oven installation comprises 108 ovens and the by-product plant includes semi-direct ammonia recovery, crude benzole production, purifiers for surplus gas and compressors for gas delivery to the Wales Gas Board's grid. There is also a power station with boilers fired either by solid fuel of coke oven gas.

The ovens are of the compound type and are of standard Simon-Carves under-jet hair-pin flue design except that there is a single waste gas flue. The weak liquor produced on the coke oven plant is pumped to a cast-iron still where free ammonia is recovered and delivered to the gas main before the absorbers. Some 1,250 tons of coal are carbonised per day and produce about 40,500 gal. of effluent, *i.e.* 32.4 gal. per ton of coal.

Drainage system

Various operations on the plant give rise to effluents which require treatment. The drainage system is so devised that the highly toxic effluents which need biological treatment are segregated from the slightly toxic effluents and the power station effluents which flow directly to the effluent sump. The surface water flows to the plant reservoirs and the sewage drains join the colliery sewers leaving the site. The chief highly toxic effluents are the spent liquor from the ammonia still and the benzole plant waters. These effluents enter the highly toxic effluent drains which lead directly to the biological oxidation plant. All manhole covers on this system are painted red.

The various effluents in the gas holder area, *i.e.* gas sealpots, gasholder storm water, Fairweather calorimeter house and some surface water, drain into the gasholder sump. By means of the self-priming pumps provided they can be pumped either to the biological unit or to the effluent sump as required. The manhole covers on this system are also painted red.

The total quantity of slightly toxic effluent is small and passes to the main effluent sump. It is made up of effluents from the caustic washing processes, scrubber sealpots, steam condensate from the iron-oxide boxes, storm water from the iron-oxide area, overflow from the oil coolers and spillage from the strong sulphuric acid storage tanks. There is no effluent from the coke-quenching operation which works on a closed circuit. The effluents from the power station *viz.* boiler blowdown, backwash from filters and ion-exchange columns also flow into the main effluent sump, as does the final effluent from the biological unit. The manhole covers in the slightly toxic effluent system are painted yellow.

CHEMICALS AND BY-PRODUCTS

The combined effluents from the main sump pass to the works reservoirs, from which any overflow is discharged to the river.

All surface water from the plant flows into the main culvert leading direct to the reservoirs. The manhole covers are painted green. The normal sewage drains pass through the site and the manhole covers are painted brown.

The biological unit, illustrated in Fig. 2 and 3, is designed to purify the highly toxic effluent and consists fundamentally of a tank approximately 53 ft. by 54 ft. by 18 ft. high together with a soil tank and a conditioning tank. The main tank is divided by internal concrete walls into four reaction tanks and four settlement tanks. Each reaction tank measures 33 ft. by 11 ft. 3 in. and is subdivided into eight passes by seven internal baffle walls. The liquid depth is 14 ft. 11 in. and the aeration tank capacity amounts to about 125,000 gal. Each settlement tank measures approximately 11 ft. 6 in sq. and is provided with a steeply sloped base. Two cross beams in each tank support a 36 in. diameter settlement pipe. The overall settling capacity is 50,000 gal.

The whole of the internal dividing walls are designed to withstand the load imposed when one tank is full of liquor and the adjacent tank is empty. The concrete walls forming the sides of the reaction tanks are thickened at the top to 24 in. to form walkways. The conditioning tank, measuring 6 ft. by 12 ft. by 18 ft., and the soil tank measuring 6 ft. by 5 ft. by 4 ft. are constructed as a monolith with the settlement tanks. A separate tank, measuring 6 ft. 6in. by 4 ft. 6in., is provided for the nutrient solution.

Eight compartments

The highly toxic effluent is received into a V-notch sump where it is measured by a Bristol recorder and then passes into the influent sump, Fig. 4. The contents of this sump are pumped into the splitter head tank by means of a 7½-h.p. LaBour pump for distribution into the reaction tanks. A Fisher valve operated by compressed air and a Bristol controller regulate the level in the influent sump. The overhead splitter tank is divided into eight compartments, each fitted with a calibrated V-notch so that the feed can be proportioned as necessary into the first and third passes of each of the four main reaction tanks. The highly toxic effluent from the gasholder area enters the influent sump from another V-notch sump equipped with a Bristol recorder.

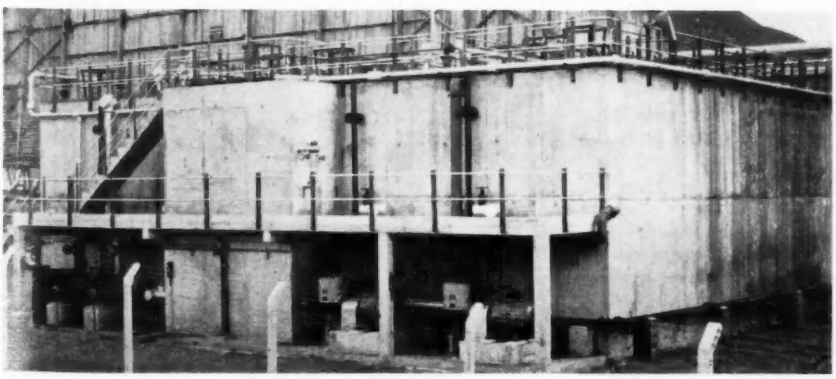

FIG. 2.

CHEMICALS AND BY-PRODUCTS

The total quantity of effluent amounts to about 1,690 gal. per hour made up of 1,440 gal. of ammonia spent liquor, 200 gal. of benzol plant effluent and 50 gal. of seal pot liquor. The dilution water amounts to 2,000 gal. per hour and the total feed is therefore about 3,690 gal. per hour.

A 1% solution of an inorganic nutrient medium is pumped into the influent sump by a 1-h.p. E.C.D. proportioning pump. The exact amount varies with the strength of the feed but is usually of the order of 5.5 oz.

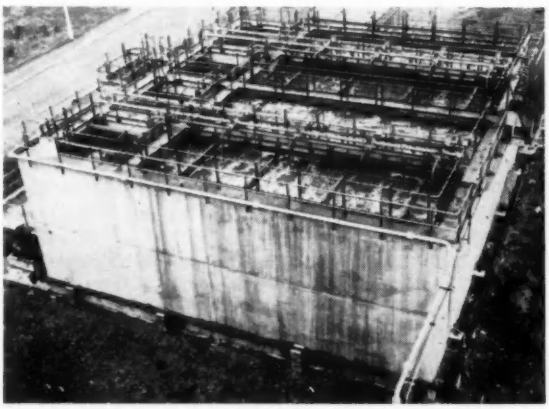

FIG. 3.

of solid nutrient per hour. The formula used is as follows:

	% by wt.
Phosphoric acid	69.0
Manganese chloride	7.8
Magnesium sulphate	6.0
Ferrous sulphate	17.2
	100.0

Air is provided by one of two 55-h.p. Connersville blowers which provide a nominal 40,000 cu.ft. per hour at 10-p.s.i. pressure. This air is distributed through porous alundum domes situated at the bottom of the reaction tanks. Ten 7-in. domes are used in each pass and create a 'spiral flow' type of agitation. The rate of aeration is about 730 cu.ft. of free air per minute. A nest of domes is shown in Fig. 5. Each air pipe is fitted with a Budenburg pressure gauge. Air is also piped to the conditioning tank and the nutrient tank. High pressure air from the works supply is available for aerating the soil suspension and for the Fisher control valve.

Sludge is returned from the bottom of the settlement tanks by one of two 5-h.p. Worthington-Simpson centrifugal pumps. The quantity of sludge returned is adjusted by means of the individual delivery valves and the pumping times are controlled by time switches. The time cycle is normally 50% and the sludge return about 4,000 gal. per hour. As required, usually once a week, batches of sludge are passed to the conditioning tank for re-aeration. The sludge volume in the aeration tanks is maintained at 95% (15 minute settling test). The retention time is 22 hours in the aeration tanks and 9 hours in the settling tanks, giving a total of 31 hours.

The plant operates successfully between 35° and 40°C. and a Honeywell-Brown multi-point instrument is provided to record the temperatures at various key points. Eight of these points are in the first and last passes of the reaction tanks, one in the conditioning tank and one in the liquor feed line. The temperature in the reaction tanks depends mainly on the temperature of the feed. In winter this has to be kept at about 55° to 60°C. whereas in summer 40° to 45°C. suffices. The temperature is regulated by adjusting the quantity of dilution water and spray water. If warm dilution water is required it is taken from the primary coolers and if cold dilution water is needed it is added at the feed sump of the biological unit.

To avoid excessive foaming it is necessary to spray the surface of the reaction tanks with water. Five Watson 30° solid angle sprays are used per pass, each nozzle consuming about 12 gal. per hour of fresh water, amounting to about 2,000 gal. per hour in all

Bacteria conditioning

Steam heating is required for the initial conditioning of the bacteria to the operating temperature of 37° to 40°C. and in the event of the plant requiring fresh bacteria it might again be necessary but it is not needed for normal operation. This soil conditioning is a very simple process. At Cwm about 20 tons of suitable top soil were accumulated on a site near the plant and sprayed with gradually increasing concentrations of ammoniacal liquor for a period of four weeks. The soil was then agitated vigorously with water in the soil handling tank and the suspension of clay which passes through the $\frac{1}{8}$-in. perforated baffle pumped to the soil conditioning tank.

A small laboratory is provided to enable daily routine analyses to be made on the spot. Phenol, thiocyanate, *p*H value and sludge content determinations are carried out daily. Other determinations such as ammonia, cyanides and dissolved solids can be done if necessary but are usually carried out fortnightly when complete analyses which include P.V., B.O.D., etc., are made in the central works laboratory. The daily routine tests, for which rapid and accurate methods have been selected, give a good indication of the performance of the unit. Daily report sheets are compiled and this record has proved invaluable. A switch room is also provided and is equipped with separate installations for each pump system. A change over from one system to the other is made weekly.

FIG. 4.

From the outset the plant has worked very satisfactorily, both technically and mechanically. Typical performance figures are given in Table 1.

CONT. on p. 445.

CONT. from p. 442.

TABLE I.

Constituent	Parts per million		Lb. per 1,000 cu. ft. aeration tank capacity per day			% removal
	Feed liquor	Effluent	Load	Residual	Destroyed	
pH Value	8·3	7·8	—	—	—	—
Suspended matter	—	60	—	4·09	—	—
Free ammonia as NH_3	145	110	—	—	—	—
Fixed ammonia as NH_3	289	198	—	—	—	—
Monohydric phenols as C_6H_5OH	750	4	33·13	0·27	32·86	99·2
Polyhydric phenols as C_6H_5OH	nil	nil	—	—	—	—
Thiocyanate as CNS	170	1	7·5	0·07	7·43	99·1
Thiosulphate as S_2O_3	120	nil	5·32	nil	5·32	100
Free cyanide as CN	1·08	0·22	0·048	0·015	0·033	68·8
Fixed cyanide as CN	1·38	0·25	0·061	0·017	0·044	72·1
Permanganate value (4 hrs.)	1960	64	86·64	4·36	82·28	95·0
Biochemical oxygen demand	—	18	—	—	—	—

Flows—gal. per 1,000 cu.ft. aeration tank capacity per day.

Carbonisation effluent	2,025
Dilution water	2,396
Total feed	4,421
Spray water	2,396
Final effluent from unit	6,817

Air consumption

Cu.ft per gal. of feed liquor	11.9
Cu.ft. per lb. of P.V. removed	640.4
Lb. per lb. of P.V. removed	51.7

The foregoing analytical figures refer to the final effluent from the biological oxidation unit. The cost of treatment amounts to roughly 3½d. per ton of coal carbonised, of which sum 1d. represents depreciation.

In conclusion, it is gratifying to note that this process, which is the subject of British Patent 811,162—1959 is now being operated not only at National Coal Board plants but by a number of other organisations both at home and abroad.

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[1] R. J. Barritt, D. E. Cunningworth, E. R. Forlin, 'A Process for the Treatment of Effluents from Carbonisation Plants.' The Gas World, 1st January, 1955, and Journal Inst. of Sanitary Engineers, July, 1955.

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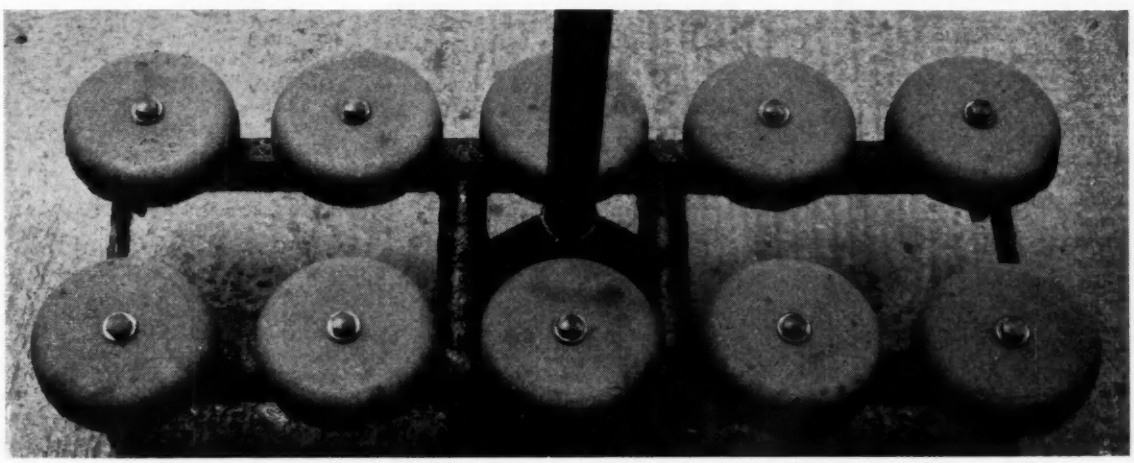


FIG. 5.

Tar acids in black and white disinfectant fluids

WATER-MISCIBLE solutions and emulsions containing coal-tar acids have been used for disinfectant purposes for many years; the former are generally known as 'black fluids' and the latter as 'white fluids'. Originally the active ingredients were wholly derived from coal tar, but it is now common for them to include similar acids derived from petroleum, and some manufacturers add active ingredients of other types.

In order to avoid the complications which might result from indiscriminate use of the established terms 'black fluids' and 'white fluids', the British Disinfectant Manufacturers' Association has now recommended that these terms should be applied only to fluids containing coal-tar acids, or similar acids derived from petroleum, or mixtures of these. If other active ingredients are also present, the designations 'modified black fluids' and 'modified white fluids' should be used. These definitions enable a method to be specified for the determination of tar acids in black and white disinfectant fluids, which is the subject of this new British Standard, B.S.3265.

Copies of this standard may be obtained from the British Standards Institution, Sales Branch, 2 Park Street, London, W.1. price 4s. 6d. (Postage will be charged extra to non-subscribers).

NEWS SUPPLEMENT

HOW MAIN-STOTT MOVE WILL WORK

THE resources of Stotts of Oldham and R. & A. Main, two well-known manufacturers of catering equipment, have now been combined as a result of the former's amalgamation with Glover & Main.

To give complete customer service the two companies will in future, for all catering equipment, trade only under the name of Stotts of Oldham, and it is expected that the amalgamation will become effective on November 1 1960.

The combined range of equipment now offered represents one of the most comprehensive selection of catering equipment appliances manufactured by any organisation.

The new combined sales force of Stotts of Oldham will now include over 30 technical representatives throughout the country based at six branch offices and showrooms in London, Bristol, Manchester, Birmingham, Leeds and Glasgow.

This extensive range of catering equipment can receive immediate personal attention on any sales, service or technical matter.

SALES DRIVE '30 YEARS TOO LATE'

THE gas industry's selling drive has come 30 years too late; it should have begun in 1930 when electricity took over street lighting. This is the conclusion of Mr. A. J. Blackie, addressing the Scottish Western Juniors Gas Association, of which he is the new president. He said although the domestic load was of primary importance, the industrial market was vital if the gas industry was to improve its position today.

Not only must the selling of gas be improved, especially in some of the smaller places, but also manufacturing costs must be reduced to the absolute minimum; gasworks' managers must be sure that they are not employing one or two men more than they need.

UP *goes coal—and gas coke, too*

UP goes the price of coal this week, presenting a new problem for the nation—in particular for the fuel industries. While gas boards will undoubtedly have the matter under review, it does not appear that any immediate increase will arise in the price of gas—but a Gas Council statement has announced already that gas coke is to cost about sixpence a hundredweight more, with some larger increases for the specially prepared fuels.

The statement says that the new coke prices will become effective 'on or shortly after the date on which the prices of coal are increased.'

Average increases per ton for coal are: 6s. 8d. up for the gas industry, 5s. 1d. for electricity, 8s. 11d. up for coke ovens, 10s. for railways, 6s. 1d. for iron and steel and 10s. a ton up for domestic consumers.

The National Coal Board has held the general level of coal prices unchanged for over three years—since July 1, 1957.

That period has seen a continuous contraction of the coal industry to bring output into line with sharply falling demand. In the three years since the last price increase in 1957, says a Board statement, the annual consumption of coal has gone down by almost 30 mill. tons. The measures needed to reduce output to this level of demand have been complex and costly.

Improvement

Nevertheless, over the last three years the Board has achieved a remarkable and sustained improvement in productivity; there was a rise over the years 1958 and 1959 of two cwts. or 8% in output per manshift, and there has been a further increase of 3½ per cent. in 1960. The average costs of production were brought down by 1s. 6d. a ton in 1959. Reductions in costs from economies and improvements in efficiency in all fields are running at the rate of £50 mill. this year compared with 1957.

These savings, although substantial, have only partly offset some of the very heavy financial burdens which have fallen on the Board.

£10,815 LOSS AT LISBURN

A gross loss of £10,815 for the year ended March 31, 1960, appeared on the accounts of the Lisburn (County Antrim) gas undertaking, a deficit £8,305 greater than that of the previous year.

The local Council, which heard a report of the loss, was told by Mr. R. C. Newell, the Town Clerk, that a large part of that increase was the result of repairs to the gasworks which had been carried out in order to maintain the plant. The price of gas had been raised on July 1, and providing consumption remained fairly stable, it was expected that the situation over the remaining nine months of this year would show a considerable improvement.

The Council decided to apply to the Ministry of Commerce for powers to borrow £42,000 in order to provide a bulk supply of gas from Belfast.

COMING EVENTS

September 30.—I.G.E., MANCHESTER AND DISTRICT SECTION: Visit to Lancashire Tar Distillers, Cadishead.

October 1.—EAST OF SCOTLAND JUNIORS: Social Club Rooms, Albany Street, Edinburgh. Presidential Address of D. R. Adams.

October 4.—SOUTH EASTERN G.C.C.: Caxton Hall, Westminster. 11 a.m.

October 4.—THE COMBUSTION ENGINEERING ASSOCIATION, Northern REGION: Visit to Imperial Chemical Industries Ltd.

Plant works well

BANGOR (CO. DOWN) BOROUGH COUNCIL has been informed that the new retort plant at the Council's gas undertaking is working satisfactorily, maintaining a steadier and more uniform calorific value. Pressures are also more uniform, giving increased appliance performance.

. . . and UP goes the pay bill for gas boards

OBITUARY

MR. DAVID MORTON, a former manager of Arbroath gasworks, has died at Gosforth, Newcastle, at the age of 68. Mr. Morton started his career in the Kirkcaldy gasworks, and from there went to Grangemouth as assistant manager. After the first world war he returned to Kirkcaldy as assistant engineer and manager. He was engineer and manager of the Kinross and Milnathort Gas Light Co. Ltd. when he was appointed to the Arbroath post in 1932. During the last war he left Arbroath for an appointment with the Ministry of Fuel and Power in Newcastle. He later became regional controller for North-east England.

MR. H. C. WIDLAKE, for 40 years mechanical and electrical engineer at the Coxside works at Plymouth until his retirement in 1952, has died. Mr. Widlake was well known as a writer and lecturer on technical matters and as the inventor of a system of controlling district gas pressures which keeps a works operator informed of pressure conditions at points many miles away. In conjunction with the Institution of Gas Engineers and the National Gas Council he carried out valuable work for the safety of users of both gas and electricity, which was officially recognised in 1937 when he was one of the two British gas officials invited to present a paper before the International Gas Conference in Paris.

MR. HENRY PULLAN, technical manager of Wilsons and Mathiesons, Ltd., Armley, Leeds, died suddenly after travelling from Leeds to Dartmouth, where he and his wife were to spend a holiday. Mr. Pullan, who graduated at Leeds University and became an industrial chemist, had served the firm for more than 30 years.

LORD ADAMS OF ENNERDALE has died aged 69. A former director and general manager of the West Cumberland Industrial Development Co. Ltd., and an ex-member of the Northern Gas Board, Lord Adams began his working life as a labourer.

£6m. STEEL COMPANY SALE

STAVELEY Iron and Chemical Company, the second largest of the steel companies which are still State-owned, has been sold to Stewarts and Lloyds by the Iron and Steel Holding and Realisation Agency for £6m.

The Exchequer will have lost just over £2m. on the nationalisation and resale of Staveley Iron and its associates, including the Sheepbridge Company, says the Political Correspondent of The Financial Times.

The total compensation at the State take-over was £10.5m., of which £8.4m. has been recovered by I.S.H.R.A.

FLOOD THREAT AT PORTRUSH

FLOODS in N. Ireland caused about £500 damage at Portrush gasworks when water three to four feet deep in the yards came near to causing an explosion.

Mr. G. F. Keane, manager of the undertaking said meters, pipes and fittings had been damaged.

About 75 meters which were under water would probably have to be replaced. When the water began to rise the buoyancy of the meters forced the pipes to bend and break.

At the height of the floods Mr. Keane had to call on the assistance of the Northern Ireland Fire Authority, and a crisis was averted when an auxiliary engine from Portstewart arrived and pumped water from the retort houses for almost six hours.

ANOTHER costing item which will affect the gas boards is a pay increase of between 5% and 6% for more than 80,000 of the industry's manual workers which, it is estimated, will add about £3m. a year to the wages bill.

A statement issued by the National Joint Industrial Council for the Gas Industry says that the question of further increases to gas fitters in respect of skill and responsibility is still under consideration.

Gas workers last received an increase in 1958. The rise took effect from September 18. Appropriate adjustments are to be made in the rates of pay for women, gas workers under 21, and piece workers.

The final settlement, says the Financial Times Labour Correspondent, was in fact identical to that reached for labourers in electricity; an increase of 3d. an hour, or 10s. 6d. for a 42-hour week, for all adult male workers.

The last increase for gas workers was in 1958, when the labourers' rate was raised to £8 16s. 11d. The new rate will be £9 7s 5d. compared with the £9 9s. a week now paid to unskilled men in electricity supply.

PERSONAL NOTES

MR. PHILIP W. B. KING, a Director and the Northern Manager of Walter King, Ltd., has accepted the appointment of Northern Manager (U.K.) for the United International Industrial Press Ltd., a company representing the interests of a syndicate of American publishers. He assumes his new duties on November 1. Mr. Philip King will remain on the Board of Walter King, Ltd. We hope to be able at an early date to name his successor as our representative in the north.

MR. D. D. MELVIN of Edinburgh, member of the Scottish Gas Board and immediate past president of the Institution of Gas Engineers, is being presented with honorary life membership of the Scottish Western Junior Gas Association. 'Mr. Melvin has proved to be a staunch friend of this Association, of which he is a member, as well as of the Junior movement as a whole,' says the Association. To mark the occasion a small gift will be presented as a token of esteem and in appreciation of a lifetime of service to the gas industry.

CAPTAIN (E) W. GREGSON, C.B.E., retires from the board of Spencer-Bonecourt-Clarkson Ltd. on September 30. He is on the board of West's Group Industries Ltd., of Manchester, and takes up the appointment of Managing Director of West's Piling & Construction Co. Ltd. of Harmondsworth, Middlesex, a subsidiary of W.G.I. Ltd., on October 1. Captain Gregson is Vice-Chairman of the Advisory Council on Research and Development, and Chairman of the Standing Committee on Fuel Technology of the Ministry of Power.

MR. E. H. S. VAN SOMEREN has recently joined the British Welding Research Association as a Principal Scientific Officer and is to work on fundamental studies on the physics of the welding arc by optical observations. Since 1958 he has been in the Research Department of Murex Welding Processes Ltd.

MR. W. MUIR has been appointed London Manager of Bray Construction Equipment Ltd., of Feltham, Middlesex. Mr. Muir was previously with the Caterpillar Tractor Co. Ltd., in Leicester as parts promotion manager, and later as manager, London Office.

MR. C. F. HEWLETT has been appointed sales representative for the East Anglia area of E. Boydell and Co. Ltd., of Old Trafford, Manchester. Mr. Hewlett, who succeeds MR. E. KAVANAGH, has been Boydell's service engineer in Scotland for the past ten years.

MR. WILLIAM FOSTER, formerly sales director of the Meters Division of United Gas Industries Ltd., has been appointed Sales Director of the Engineering and Appliances Division with effect from October 1.

99TH ANNUAL GENERAL MEETING AT LARGS

Scottish Association agrees to become District Section of the Institution

THE hundredth annual general meeting of the Scottish Association of Gas Managers (to be held in Edinburgh on September 14 next year) will be its last. Steps will then be taken to transform the Association into a Scottish Section of the Institution of Gas Engineers.

This was decided at the ninety-ninth A.G.M. in Largs last week, when approval was unanimously given to the following motion:

'That the Scottish Association of Gas Managers adopts the rules of the Institution of Gas Engineers District Sections, and agrees to becoming such a District Section with the title, namely, "the Institution of Gas Engineers, Scottish Section (incorporating the Scottish Association of Gas Managers)" with effect from the conclusion of the annual general meeting of the Scottish Association of Gas Managers, to be held in Edinburgh in September, 1961.

Office held until 1961 A.G.M.

'That the first officers and Management Committee of the Institution of Gas Engineers, Scottish Section, shall be the officers and Council holding office after the conclusion of the annual general meeting of the Scottish Association of Gas Managers, to be held in Edinburgh in September, 1961.'

Presenting the motion, Mr. W. S. Johnston, Glasgow, President of the Association, said:

'During the past year a sub-committee of the Council was formed to carry out the necessary negotiations with the Institution of Gas Engineers and the Scottish Gas Board. These have been completed and the results are submitted for your consideration.

'In considering the incorporation of the Scottish Association of Gas Managers into a District Section of the Institution of Gas Engineers, two main points had to be agreed—namely, membership, and the disposal of the funds of the Association.

'The agreement with regard to membership is as follows: All who are in membership of the Association on a prescribed date, and who are not already in a class of membership of the Institution, are entitled to make application for such membership. This includes all extraordinary members of the Association. All affected by this agreement will be informed of the procedure required to achieve this.

Disposal of funds

'With regard to the disposal of the funds, the Association may elect to continue to administer them as a District Section. Your Council recommends that the following funds, namely, General and Excursion Fund, Education Fund, William Young Memorial Fund, and J. W. McLuskey Fund continue to be controlled by the District Section.

'There remains the Benevolent Fund. Enquiries have revealed that the Institution dispenses more benevolence in Scotland than the Association and that there is no discrimination made with regard to habitat by the Committee of Management. The Council are, therefore, prepared to recommend that with suitable provision being made by the Institution for those who would be entitled to benevolence from the Association but not from the Institution, the Benevolent Fund be handed over to the Institution for administration. We have assurance that that provision will be accepted by the Institution.

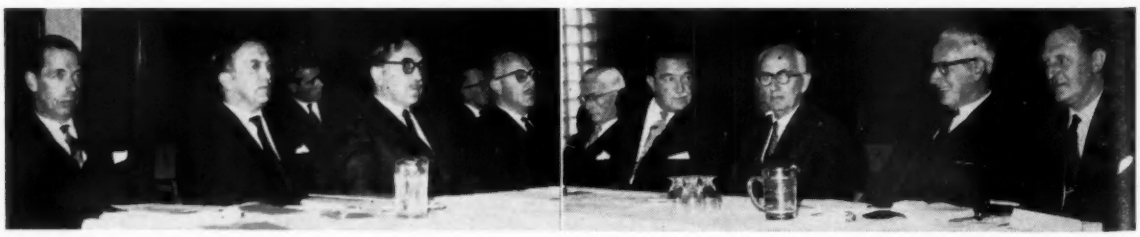
'Nothing is gained without sacrifice, and a District Section cannot appoint honorary or life members. That is a most jealously guarded prerogative of the Institution of Gas Engineers. Members in retirement may continue in membership of the Institution by the payment of a reduced subscription and in certain circumstances such members may be continued in membership of the District Section without subscription.

'The Chairman of the Scottish Gas Board was consulted with regard to the facilities that would be granted to allow the District Section to function. The Board have now approved of the following arrangements: Three meetings will be held per annum. Two of the meetings will be half-day meetings held in two Divisions of the Scottish Gas Board. These meetings shall be attended by members of the Section employed in the Division in which the meeting is being held, plus members of the Management Committee. The third meeting shall be the annual general meeting and shall be held in the third Division. This meeting shall retain the form of the present annual general meeting of the Scottish Association, which devotes the first day to business and a reception and dance and the second day to social activities—golf and bowls. All members of the Section shall be eligible to seek leave to attend the annual general meeting. The Scottish Gas Board shall bear the cost to employees of the annual subscription to the Institution of Gas Engineers, but members shall be liable for their annual subscription to the Section.'

Spirit of co-operation

The motion was seconded by Mr. E. G. Smith, Glasgow, who commented that all who had taken part in the negotiations were to be complimented on the spirit of co-operation that had been shown.

Earlier in the proceedings, in opening the conference, the president welcomed the presence on the platform of distinguished guests. These included Sir Henry Jones, Chairman of the Gas Council; Mr. Sydney Smith, Chairman of the Scottish Gas Board; Mr. T. C. Bat-



Among those on the platform were—in the left hand picture, D. Beavis, vice-president; H. R. Hart, Deputy Chairman Sc.G.B. E. J. C. Dixon and Sydney Smith, Chairman Sc.G.B. In the right hand picture, Sir Henry Jones; T. C. Battersby; Dr. W. T. K. Braunholtz; D. D. Melvin, and F. Dickson.

Members of the Council who were present at the Meeting.

tersby, senior Vice-president of the Institution of Gas Engineers; Mr. E. J. C. Dixon, Controller of Gas Standards, Ministry of Power; and Dr. W. T. K. Braunholtz, Secretary of the Institution of Gas Engineers. Mr. Johnston also congratulated Mr. H. R. Hart on his appointment as Deputy Chairman of the Scottish Gas Board, and extended the Association's good wishes to Mr. D. D. Burns, now retired from active service in the gas industry after a long and distinguished career.

Two setbacks

Addressing the meeting, Sir Henry Jones said that two very recent events would not make life any easier for them. These were the agreement on a wages increase for manual workers (after improvements in their conditions earlier in the year by the introduction of a 42-hour week) and the latest rise in the price of coal.

'I believe we have an opportunity as an industry if we can tell the public what the services are that we can offer, so that no one can claim that they have not heard what gas can do—which is something I hear in too many parts of the country. If we give good service at a fair price and back that up with public relations and advertising and selling, and if, beyond that effort we have all got to make, there is equal effort on the part of the people responsible for the production, I believe we are going to see a really major development in the gas industry within the next few years. We are not going to get on with old methods.'

Sir Henry said that the country as a whole showed an output of gas so far this year that was considerably more than could be accounted for by the colder weather this year. There was a distinct upward trend. What was very important, he was told by people working in different Boards of the enormous interest in space heating by gas, often combined with water heating. That indicated a trend towards a much wider interest in the use of gas, and suggested that they could share in the increased expenditure on comfort in the home.

The industrial gas market offered another opportunity for very considerable expansion. There was already a good industrial load, but there was room for much more if they could keep their costs competitive and had a selling organisation as good as it could be.

Mr. Sydney Smith, Chairman of the Scottish Gas Board, declared that the Board was faced with an extra annual expenditure of £600,000 as a result of the rise of 6s. 8d. a ton in the price of coal. The total extra bill, he added, would reach not far short of £1 mill. when there were added the cost of reducing the working week to 42 hours and salary and wage increases.

Change in production

A major change in production, he continued, would take place during the next three or four months, when the Lurgi plant at Westfield went into production and gas was fed into the national grid for Scotland. Work on the grid was well up to schedule. Because of the urgent need to have a supply of gas ready for the new works of the British Motor Corporation near Bathgate, the branch to Falkirk and Armadale was about to be laid a year or two ahead of programme. It was likely that both these works would remain in production, depending upon the demand for gas and other factors, at least for a few years.

Westfield up to schedule

'I was over at Westfield last week,' remarked Mr. Smith. 'Most of the work is up to schedule. One boiler was already steaming and under test at full working pressure. Machinery is being run in. Other sections of plant are being commissioned, and it is expected that the first gasifier will be charged early in October. From that point things will begin to move forward rapidly, and it is expected that first-stage production of 15 mill. cu.ft. a day will be feeding into the grid about the turn of the year. This says a very great deal for our engineering staff and for the contractors. When the second stage of production is completed, early in 1962, Westfield will become the hub of production for Scotland.'

Mr. Smith went on to say that the Board's deficit for the year to March 31, 1960, was very much less than had been budgeted for, largely because of higher sales than anticipated in the last quarter of the year, improved efficiency of production, and the benefits of integration of 194 producing works taken over at vesting date, 95 had now been closed down following the provision of bulk supplies from more economic works, and it was probable that a further five works would close by March next year.

Prize winners in the Golf Competition, left to right—A. McFadyen; Francis D. Drake, Challenge Bowl; D. D. Burns; Mrs. J. M. Adams, who presented the prizes; David Fulton, the Winson Scott Veterans Cup; J. M. Adams, captain; E. G. Smith; T. Thomson, secretary.

'Sales of appliances during the last financial year were an all-time record and very nearly reached £4 mill. in value—an increase approaching 70% on the previous year. This shows what can be done when there are no restrictions on hire-purchase. Unfortunately restrictions were imposed again on April 29, and for the first four months of the year, to July 31, hire purchase sales were down by 55%, cash sales by 9%, and the two combined by 47.5% as compared with the same period last year. To say the least, these results are most discouraging. But they are a challenge, or should be, to our sales staff to go out and sell. The money is there, and if we don't get our share of it other concerns will.'

Sales of gas for the same period were down overall by 3.6%, but industrial sales were up by 9.5%. There was an expanding potential for sales to industry. Accordingly, 'the Board have decided to strengthen the industrial sales organisation by the appointment of three additional qualified engineers who will be centred in Glasgow to assist Mr. A. Higgs (Area Industrial Gas Officer), but who primarily will be available on call throughout the area.'

Though domestic sales were down by 9.1%, and the continued fall was a matter of very serious concern, there was one encouraging fact—a substantial increase in the number of people transferring to the optional domestic two-part tariff.

Source of encouragement

'Another source of encouragement: The "total gas available" figure for the 23 weeks to September 11 is only 1% down compared with the corresponding period last year. This means that, among other considerations, the cooler weather in August has been of great help to us, and if the rowan berries and the hawthorn berries mean anything, we're in for a hard winter—I hope!'

Mr. T. C. Battersby, conveying the good wishes of the Institution of Gas Engineers, welcomed the possibility of closer working between the two organisations. He expressed the hope that there would be continued interest in the Institution's Benevolent Fund. 'At the present time we are making grants amounting to many thousands of pounds to persons resident in Scotland. Strange as it may seem in this Welfare State, the demands on our Fund do not diminish.'

Mr. E. J. C. Dixon, Ministry of Power, in a brief comment, referred to the many important developments of the present times that might lead to the possibility of modifications in the Gas Act.

It was intimated that the following students had passed the associate membership examination of the I.G.E.—Messrs. R. M. Miller, Coatbridge; M. J. O'Keefe, Methil; M. F. Roberston, Johnstone; D. M. Williamson, Methil. Certificates were presented by Mr. Johnston.

Press relations

The first of the two papers presented was by Mr. R. Dunnett, the Board's Press and Public Relations Officer, and was on the subject of 'Press and Public Relations.' Mr. A. McFadyen, Glasgow; Mr. A. M. Jackson, Dumbarton; and Mr. A. Bogie, Glasgow, took part in the discussion that followed.

The second paper was by the Board's Installations Officer, Mr. S. Perriss, on 'Present-day Methods of Heating Domestic Premises.' The discussion was shared by Mr. R. Cowie, Domestic Sales Manager, Glasgow; Mr. A. Higgs, Industrial Gas Officer, Glasgow; Mr. R. D. Bruce, New Buildings Gas Sales Officer, Glasgow; and Mr. D. E. Moore, Commercial Gas Sales Officer, Glasgow.

The meeting entered its concluding stages with the installation of Mr. D. Beavis as the new President.

Golf Contest Result

THE Autumn Competition of the Scottish Association of Gas Managers' Golf Circle was played at West Kilbride, Ayrshire, on Friday, September 16.

In Section 1, the Challenge Bowl and Replica was won by Mr. F. D. Drake with 83—12—71. The second prize was won by Mr. D. Harrison with 84—9—75. There was a tie for third place between Mr. J. A. Franklin with 84—8—76, and Mr. C. B. S. Mitchell with 82—6—76.

The first prize in Section 2 was won by Mr. A. McFadyen with 86—13—73. Second was Mr. H. S. Milne with 90—14—76, and there was a tie for third place between Mr. D. Wilson and Mr. J. Hendry, both with 92—15—77, and Mr. R. Congalton with 96—19—77.

The Winston Scott Cup/Veterans Trophy was won by Mr. D. Fulton with 97—17—80 and Mr. J. M. Adams with 96—16—80, in a tied match.

In the Visitors' Competition, the first prize was won by Mr. J. R. Denoon with 91—14—77. Mr. C. R. Averill was second with 96—16—80, and Mr. P. A. E. Wallis was third with 100—18—82.

The winner of the Handley Salver and First Handicap Prize was Mrs. S. Hall, second prize being gained by Mrs. E. G. Smith. The scratch prize was won by Mrs. H. Milne.

Bowling contest

Many members and visitors attended the annual competition of the Scottish Association of Gas Managers' Bowling Club at Douglas Park Bowling Green, Largs.

The trophy was won by the following rink, which was 15 shots up:—T. Scott, Langholme. B. B. Florence, Inverurie. Councillor A. Thomson, Largs. J. G. Rutherforth, Edinburgh (skip.).

Second: L. Bain, Greenock. J. McMillan, Airdrie. W. M. Gledhill, Stirling. R. C. Meikle, Moffat (skip). Nine shots up.

Prizes were presented by Mrs. W. S. Johnson, and at the annual general meeting Mr. J. G. Rutherforth was elected President of the Club for 1960-61.

Winning rink in the bowls game—Councillor Adam Thomson, Largs; B. B. Florence, Inverurie; John Rutherforth, skip., Edinburgh, Mrs. W. Johnston presenting the trophy; T. Scott, Langholm and R. C. Meikle, president of the Bowls Circle, who is from Moffat.

B.H.D. Engineers Limited

HEAVIER COMPETITION

MR. F. BRIAN HOLMES' REVIEW

THE 12th Annual General Meeting of B. H. D. Engineers Limited was held on September 8 at 4, Whitehall Court, London, S.W.1, MR. F. BRIAN HOLMES, M.Inst.Gas E. (the chairman), presiding.

The following is his report which has been circulated to shareholders.

The accounts for the year show a profit on trading of £626,824, compared with £634,874 for the previous year. The amount provided for depreciation is £140,043, compared with £142,601 for the year to March 31, 1959. The profit before tax amounts to £417,886, as against £440,929 in the previous year. Taxation absorbs £209,420, as against £216,350 and, after making adjustments for minority shareholders' interest at £5,267, the profit after tax is £203,199, compared with £219,715 in the preceding year.

Your Directors recommend a final Dividend of 12½% plus a Special Bonus of 5% making, with the Interim Dividend of 5% already paid, a total distribution of 22½% for the year.

The title 'Special Bonus' is retained for the 5% distribution as there can be no certainty that this will be repeated at the end of the present year.

The sum of £94,440 has been transferred to General Reserve in the accounts of the Subsidiary Companies. In the consolidated balance sheet the Share Capital and Reserves have increased during the year from £1,984,081 to £2,115,978. The bank overdraft has again been reduced and the cash at bank increased. The total increase in the cash position of the company amounts to £313,701.

Trading conditions

In my statement last year I drew members' attention to the fact that in the past the major work of the Group has been with the coal, gas and steel companies and that as a result, during the last few years the demand for the Group's products has been on a much reduced scale. The problem caused by this situation continues to exist and can only be met by the introduction by the Group of new techniques and new products, a policy which your Board is pursuing vigorously.

Company Meeting

It must be realised that all suppliers to these industries are faced with similar problems; competition is therefore extremely keen and profit margins lower than for many years.

Subsidiaries' activities

On the other hand, the expansion of the motor industry has had the reverse effect on the activities of two of our subsidiaries, namely, British Furnaces Ltd., and particularly The Holset Engineering Co. Ltd. The new administration and technical offices for British Furnaces should come into full use within the next two to three months and will be of the greatest value in the light of the company's increased commitments. To meet the increasing demand for diesel and petrol engine accessories, your Directors have also recently sanctioned a further extension to the production facilities of Holset Engineering. A particularly gratifying feature of this business is that a high proportion is for export.

It will be appreciated that the year under review has not been an easy one for makers of capital equipment; the fact that our trading surplus is only some £16,000 less than last year is largely due to the completion of several long term contracts, and to the increased volume of business done by Holset Engineering.

You will see in the notes on the consolidated balance sheet that reference is made to our Canadian company—The Bryan Donkin Company (Canada) Ltd. There is steady progress to report and prospects appear encouraging, although as mentioned in last year's statement, it will be some years before the full potential of the company is developed and it becomes of real value to the Group.

Reference is also made to the acquisition of Ball Couplings Ltd. This represents, in effect, the purchase of the patents of a coupling device which will be produced in our own works. We have already made a small number which are in use. Should they prove satisfactory (and experience to date is promising), I hope that this may eventually prove to be a new and valuable addition to the Group's business.

The current year

Whilst there has been a welcome, if small, increase both in the number and the value of orders received during the last few months, the business in hand is not sufficient to keep those of our companies which produce heavy engineering plant engaged to full capacity. This fact, coupled with the intense competition and lower profit margins to which I have already referred, must have a bearing on the current year's results, which I anticipate will fall somewhat below those we have been able to show in the year under review.

Directorate and staff

Having reached retirement age, at the end of the Company's year, both Mr. R. T. Redfern (Managing Director of the Bryan Donkin Co. Ltd. for nine years and also a member of the parent company Board), retired, and Mr. P. Hopkinson (Managing Director of British Furnaces) also retired. Mr. Hopkinson had been with the Company since its inception in 1922, and its growth and success through the years are largely the result of his efforts. We are glad to have the benefit of his interest and experience as he has agreed to continue as Consultant to the Company.

To both Mr. Redfern and to Mr. Hopkinson, your Board express their sincere appreciation and thanks for their loyalty and for the valuable services which they have rendered and extend to them best wishes for a long, happy and well-earned retirement.

Mr. S. Farrer, who joined the Group in 1959, has been appointed Managing Director of The Bryan Donkin Co. Ltd., and has been invited to join the parent Board. Mr. Bonsall who for the past four years has been deputy to Mr. Hopkinson, has been appointed Managing Director of British Furnaces.

Finally, on behalf of my colleagues and myself, I would like to extend to the executives, and to every employee of each of the companies which form the B.H.D. Group, our sincere appreciation and thanks for their efforts during the year.

The report and accounts were adopted and the dividend recommendation was approved.

The election of Mr. S. Farrer, to the Board was confirmed and the directors retiring by rotation, Mr. D. Abel Smith, M.C. and Mr. G. F. Chambers, were re-elected.

Powell Duffryn dividend

THE report of the Directors of Powell Duffryn Ltd., for the year ended March 31, 1960, shows the Group trading profits before tax to be £1,867,652. After adding interest and dividends from trade and other investments, and deducting interest on debenture stock and directors' remuneration, the total earnings of the Group before tax are £2,156,500. Taxation, after taking credit for £160,000 relief from investment allowances, amounts to £863,607. Of the balance of £1,292,893, that attributable to outside shareholders amounts to £111,768, leaving the net profit attributable to the Powell Duffryn Group at £1,181,125.

The directors recommend that on the 9,660,471 Ordinary Shares of 10s. each a final dividend of 10% should be paid, less Income Tax at 7s. 9d. in the £, absorbing £295,852. This dividend, with the 6% interim dividend already paid, will make 16% for the year.

For this new installation at Bristol its

Hoochow
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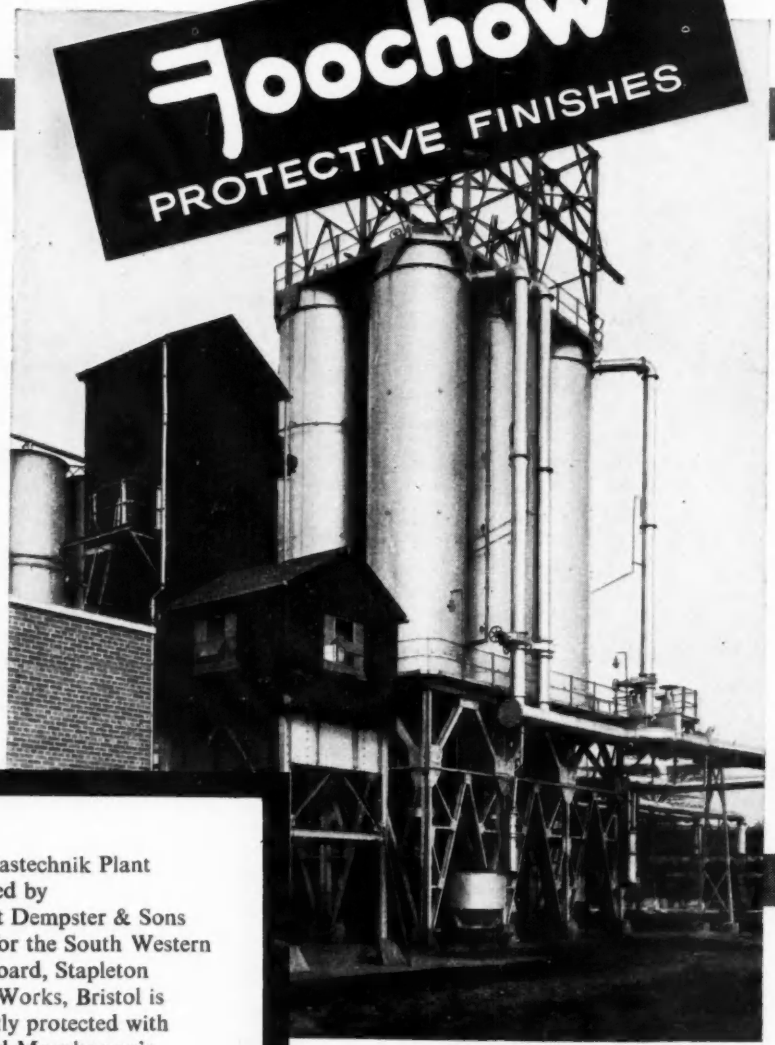

By courtesy of the South Western Gas Board, and Robert Dempster & Sons Ltd.

The Gastechnik Plant installed by Robert Dempster & Sons Ltd., for the South Western Gas Board, Stapleton Road Works, Bristol is perfectly protected with Donald Macpherson's Hoochow Chromate Red Lead and Aluminium Paint

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